REMARKS

This application has been reviewed in light of the Office Action mailed on March 24, 2004. Claims 1-30 are pending in the application with Claims 1, 11 and 21 being in independent form. By the present Amendment, Claims 1, 11, 13 and 21 have been amended and Claims 31, 32 and 33 have been added. No new matter or issues are believed to be introduced by the amendments.

Claims 1-30 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,714,997 issued to Anderson on February 3, 1998 in view of U.S. Patent No. 6,157,733 issued to Swain on December 5, 2000.

In the Office Action, the Examiner makes specific rejections with regard to Claim 11 and further states that method claims 1-10 recite steps performed by apparatus claims 11-20 and as such are similar in scope and rejected under the same rationale. The Examiner also states that claims 21-30 recite steps performed by the apparatus of claims 11-20 and as such are similar in scope and rejected under the same rationale.

In the Office Action, the Examiner asserts, with respect to Claim 11, that the acts of applying and deriving, shown below, are taught in Anderson at Col. 39, lines 15-21 and lines 44-61.

applying at least one respective transformation to each segmented object and to the background, for each of the plurality of output images; and

deriving the plurality of output images from the results of the respective transformations.

Anderson at Col. 3, lines 15-21 teaches:

> The right and left renderers, 2302 and 2303, process the current virtual viewpoint, the
> decompressed 2-D video frames, and the mesh data to respectively generate right-eye and
> left-eye 2-D images appropriately offset so as to simulate a 3-D experience for a viewer at
> the current virtual viewpoint.

Anderson at Col. 3, lines 44-61 teaches:

> FIG. 32 illustrates, as an example, certain parameters used by the right and left renderers,
> 2302 and 2303, in rendering their respective right-eye and left-eye frames. For each eye,
> the viewpoint is respectively offset from the current virtual viewpoint by half the
> interocular distance (i.e., distance between the viewer's eyes), and directed towards an
> object being focused upon. For example, the right eye viewpoint 2402 is offset from the
> virtual viewpoint 2401 by a distance j.sub.RIGHT and directed towards a point of
> convergence 2407 determined by an object being focused upon, and the left eye
> viewpoint 2403 is offset from the virtual viewpoint by a distance j.sub.LEFT and directed
> towards the point of convergence 2407 determined by the object being focused upon. The
> corresponding viewing directions for the right and left eye frames are preferably
> calculated by the right and left renderers 2302 and 2303 to converge on, for example, an
> image surface of closest depth which is not part of the background.

Anderson makes reference to a right-eye and left-eye 2-D images. These right-eye and

left-eye 2-D images correspond respectively to the left view L_k and right view R_k images

recited in Claim 11. Anderson derives the right and left eye 2-D images as a function of

(1) the current virtual viewpoint, (2) decompressed 2-D video frames and (3) mesh data.

The mesh data is generated by each camera pair's dedicated processor (e.g., 912-1 to 918-

k in FIG. 14A) for its camera pair. A triangle mesh includes a set of triangles in 3-D space

having the property that each triangle shares a common edge with at least one other

triangle in the set. A triangle mesh is preferably represented by a data structure

comprising a list of 3-D vertices (e.g., 916 in FIG. 14A), together with connectivity

information giving, for each triangle in the mesh, a list of the indices, in the vertex list, of

its vertices (e.g., 918 in FIG. 14A). Such a data structure is particularly efficient in

providing a compact representation of 3-D surfaces.

By contrast, the present invention does not consider any of the factors (i.e., factors 1 through 3 delineated above) taught by Anderson in deriving the right and left eye 2-D images. Instead, the invention derives the right and left eye 2-D images by computing respective left (TL) and right (TR) transformations of foreground objects, followed by computing respective left (HL) and right (HR) transformation of the background and finally combining each of the left foreground and background transformations (TL + HL) and each of the right foreground and background transformations (TR + HR) to derive the respective left (Lk) and right (Rk) eye views, as recited in Claim 11.

In response, independent Claims 1, 11 and 21 have been amended herein to better define Applicants' invention and to patentably distinguish Applicants' invention over Anderson in view of Swain. In particular, Claim 11 now recites:

11. An image processing device, comprising
an input for receiving at least one monocular video input images I_k;
at least one processor adapted to perform the following operations
segmenting at least one foreground object from the input image;
applying **a respective left (TL_m) and right (TR_m) foreground** transformation to each segmented **foreground** object and **a respective left (HL) and right (HR) background transformation** to the background, for each of a plurality of output images;
combining the respective left transformation corresponding to each segmented foreground object (TL_m) with the respective left background transformation (HL) corresponding to the background to generate a left view L_k for each of said plurality of output images;
combining the respective right transformation corresponding to each segmented foreground object (TR_m) with the respective right background transformation (HR) corresponding to the background to generate a right view R_k for each of said plurality of output images.

Accordingly, for at least the reasons given above, it therefore follows that Anderson in view of Swain, alone or in combination, do not anticipate the subject matter of Claim 11.

Accordingly, applicants respectfully request withdrawal of the rejection under 35 U.S.C. §103(a) with respect to Claim 11 and allowance thereof is respectfully requested.

Claims 12-20 depend from independent Claim 11 and therefore contain the limitations of Claim 11. Hence, for at least the same reasons given for Claim 11, Claims 12-20 are believed to be allowable over the Anderson in view of Swain, alone or in combination. Accordingly, withdrawal of the rejection under 35 U.S.C. §103(a) with respect to Claims 12-20 is respectfully requested.

Independent Claims 1 and 21 recite similar limitations as the limitations recited by independent Claim 11 and are believed to be in condition for allowance for at least the same reasons given for Claim 11.

Additionally, Claims 2-10 and 22-30 depend respectively from Independent Claims 1 and 21 and therefore contain the limitations of Claims 1 and 21. Hence for at least the same reasons given for Claims 1 and 21, Claims 2-10 and 22-30 are believed to be allowable over Anderson in view of Swain, alone or in combination. Accordingly, withdrawal of the rejection under 35 U.S.C. §103(a) with respect to Claims 2-10 and 22-30 is respectfully requested.

Further, Claims 31-33 have been added to further distinguish the present invention over the combination of Anderson and Swain. Specifically, Claims 31-33 are included to

patentably distinguish the disclosure of Swain at Col. 3, lines 19-48, which states, *at least one processor for segmenting at least one foreground object from the input image.*

Swain teaches at Col. 3, lines 19-48 three techniques for separating images of several objects. A first technique for separating images of several objects taught in Swain operates by matching the shape and/or color/intensity of the objects in each of the separate images to the objects in the original image. A second technique taught in Swain operates by segmenting or grouping pixels in close proximity to each other which have the same (or approximately the same) intensity or color. A third technique taught in Swain operates on the basis of detected motion whereby a plurality of successive frames of the same image are taken over a period of time from the same point and stored. The intensity or color of corresponding pixels of each frame are compared to identify any pixels which have changed (indicating motion). Pixels which have changed and which are in close proximity to each other can be grouped together as one or more segmented objects.
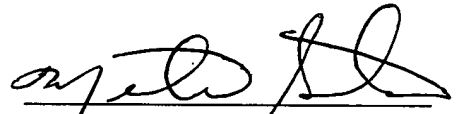
It is respectfully submitted that none of the three techniques taught in Swain teach or suggest the limitations and/or features of new Claims 31-33. Specifically, each of Claims 31-33 recite for a method, apparatus and computer readable medium, respectively, that the act of segmentation comprises the acts of (1) applying a homography transformation, (2) combining the transformed images to create a mosaic (3) applying an inverse homography transformation to the mosaic (4) extracting certain pixels from the mosaic (5) setting the remaining pixels in the mosaic to black resulting in the identification of at least one foreground object from the input image.

Accordingly, applicant respectfully submits that independent claims 31-33 be allowed.

In view of the foregoing amendments and remarks, it is respectfully submitted that all claims presently pending in the application, namely, Claims 1-33 are believed to be in condition for allowance and patentably distinguishable over the art of record.

If the Examiner should have any questions concerning this communication or feels that an interview would be helpful, the Examiner is requested to call Dicron Halajian, Esq., Intellectual Property Counsel, Philips Electronics North America, at 914-333-9607

Respectfully submitted,

Michael A. Scaturro
Reg. No. 51,356
Attorney for Applicant

Mailing Address:
Intellectual Property Counsel
Philips Electronics North America Corp.
P.O. Box 3001
345 Scarborough Road
Briarcliff Manor, New York 10510-8001